54TH CONGRESS, 1st Session. | SENATE. | DOCUMENT No. 269.

IN THE SENATE OF THE UNITED STATES.

APRIL 21, 1896.—Referred to the Committee on Commerce and ordered to be printed.

The PRESIDENT PRO TEMPORE presented the following

LETTER FROM THE ASSISTANT SECRETARY OF WAR, TRANSMITTING REPORT OF THE CHIEF OF ENGINEERS, UNITED STATES ARMY, SUBMITTING ESTIMATED COST FOR THE CONSTRUCTION OF THE WATERWAY CONNECTING THE WATERS OF PUGET SOUND, AT SALMON SOUND, WITH LAKES UNION AND WASHINGTON; ALSO REPORT OF CAPT. THOMAS W. SYMONS, CORPS OF ENGINEERS, TOGETHER WITH THE ACCOMPANYING REPORT OF THE ASSISTANT ENGINEER.

WAR DEPARTMENT,
Washington, D. C., April 21, 1896.

SIR: In compliance with the requirements of Public Resolution No. 40, Fifty-fourth Congress, first session, approved April 18, 1896, directing the Secretary of War "to transmit to Congress the report of Captain Thomas W. Symons, Corps of Engineers, dated August twenty-ninth, eighteen hundred and ninety-five, together with the accompanying report of the assistant engineer, upon the survey of the waterway connecting the waters of Puget Sound, at Salmon Bay, with Lakes Union and Washington; also to submit an estimate of the cost of constructing the said waterway on the route described and laid down in the aforesaid report," I have the honor to transmit herewith report dated April 21, 1896, from the Chief of Engineers, United States Army, together with inclosures therein referred to upon the subject.

Very respectfully,

JOSEPH B. DOE,
Assistant Secretary of War.

The PRESIDENT OF THE UNITED STATES SENATE.

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., April 21, 1896.

SIR: By the provisions of Public Resolution No. 40, approved April 18, 1896, the Secretary of War is "directed to transmit to Congress the report of Captain Thomas W. Symons, Corps of Engineers, dated August twenty-ninth, eighteen hundred and ninety-five, together with the accompanying report of the assistant engineer, upon the survey of the waterway connecting the waters of Puget Sound, at Salmon Bay,

AUTHENTICATED U.S. GOVERNMENT INFORMATION GPO

with Lakes Union and Washington; also to submit an estimate of the cost of constructing the said waterway on the route described and laid down in the aforesaid report."

To comply with the requirements of the above joint resolution, I have the honor to submit the accompanying copies of the reports mentioned, together with copy of letter of April 2, 1896, from Capt. W. L. Fisk, Corps of Engineers, now in charge of the work, in which that officer states that the estimated cost of constructing the waterway is $2,471,751.26.

Very respectfully, your obedient servant,

W. P. CRAIGHILL,
Brig. Gen., Chief of Engineers.

Hon. DANIEL S. LAMONT,
Secretary of War.

SURVEY OF THE WATERWAY CONNECTING THE WATERS OF PUGET SOUND, AT SALMON BAY, WITH LAKES UNION AND WASHINGTON.

UNITED STATES ENGINEER OFFICE,
Portland, Oreg., August 29, 1895.

GENERAL: I have the honor to submit the following report upon the survey of the waterway connecting the waters of Puget Sound, at Salmon Bay, with Lakes Union and Washington. The work was done under my direction and supervision by Mr. Eugene Ricksecker, civil engineer, and had for its object the definite location upon the ground of the canal and of the right of way required and of all lands which would be overflowed by the construction of the canal as proposed by the Board of Engineers of 1890, and the preparation of accurate cadastral maps of all the property along the line of the waterway.

The river and harbor act of August 17, 1894, contains the following clause:

For dredging Salmon Bay, and the improvement of the waterway connecting the waters of Puget Sound, at Salmon Bay, with Lakes Union and Washington, by enlarging the said waterway into a ship canal, with the necessary locks and appliances in connection therewith, twenty-five thousand dollars: *Provided*, That no part of said amount shall be expended on the improvement of the waterway connecting the waters of Puget Sound with Lakes Union and Washington until the entire right of way and a release from all liability to adjacent property owners have been secured to the United States free of cost and to the satisfaction of the Secretary of War.

It having been decided by the Treasury that none of the money appropriated by the act could be used in surveying and defining the right of way and lands and interests from which releases would be required, the act was amended by a clause in the sundry civil bill approved March 2, 1895, authorizing the expenditure of $5,000 for the purpose.

This amendatory clause is as follows:

That the Secretary of War be, and he is hereby, authorized and directed to expend, from the appropriation of twenty-five thousand dollars "For dredging Salmon Bay and improvement of the waterway connecting the waters of Puget Sound, at Salmon Bay, with Lakes Union and Washington, by enlarging the said waterway into a ship canal, with the necessary locks and appliances in connection therewith," made by the "Act making appropriations for the construction, repair, and preservation of certain public works of rivers and harbors, and for other purposes," received by the President August seventh, eighteen hundred and ninety-four, the sum of five thousand dollars in making a definite survey and location of the said improvement and in preparing a cadastral map showing each piece of property required to be deeded to the United States or from which a release is required, with its metes and bounds.

Under date of March 8, 1895, I was instructed to proceed with the survey thus provided for.

In this connection it is deemed proper to state that the last session of the Washington legislature passed a bill giving to counties, through their commissioners, the right of eminent domain for the purpose of condemning lands and interests appurtenant thereto, when same are needed by the State of Washington or the United States in carrying on any public work.

This act was approved by the governor of the State February 12, 1895, and a copy of it is herewith.

It is understood to be the intention of the county commissioners of King County, in which Seattle and the canal are located, to proceed with the condemnation of the right of way and interests in adjacent lands as soon as these can be definitely and authoritatively known.

The survey has now been completed and the results are forwarded with this report. These results consist of the maps* showing the canal location and the lands to be taken and from which deeds of release will be required. With the maps is a list* of all these properties, with their metes and bounds and legal descriptions and owners of record.

This comprises—

(1) A list of all lands included in the right of way.
(2) Property to be released from damage.
(3) Corporate interests affected by the proposed improvements.
(4) Such property leases as are known and affected.
(5) Bridges over the proposed waterway.

If the location, right of way, etc., be approved by the Secretary of War, it is recommended that all the information be turned over to the commissioners of King County as the proper local body to take action upon securing the right of way and releases, and quieting all claims of corporations, individuals, or the public affected.

REPORT.

With this is the report of Mr. Eugene Ricksecker, assistant engineer, which describes the methods of making the survey and results as to accuracy, etc.

MAPS.

The maps forwarded and illustrating this survey are colored tracings, 12 in number, bound in a volume. Two sets of blue prints of these tracings are also sent.

Of these 12 maps, one is on a scale of 1,000 feet to 1 inch. This is in the nature of an index map and shows the route of the waterway from Shilshole Bay to Lake Washington. Upon this map are given longitudinal and cross sections of the proposed canal, and descriptive legends of the signs and colors employed.

There are 11 maps on a scale of 100 feet to 1 inch which show all land lines and all natural and artificial features connected with the right of way for the canal and the lands adjacent thereto which would be damaged by the proposed construction.

CANAL LOCATION.

The canal location varies somewhat from that adopted by the Board of Engineers of 1890, of which I was a member, as further studies have indicated these changes to be desirable.

*Not printed.

Between Salmon Bay and Lake Union the location now adopted is straighter and shorter than that proposed in 1890, and better avoids existing improvements and connects with deep water in Lake Union in a more convenient manner.

At the "Portage," or neck of land between Lakes Union and Washington, the cut through the highlands has been changed from a curve to a tangent, and the lock is located within the land lines instead of out in the waters of Lake Union beyond the uplands.

The desirability of a straight cut for the narrow channel through the uplands is obvious. The withdrawal of the lock within the uplands is to permit a straight approach immediately in front of and below the lock and to lessen the curvature of the general approach to the lock from the west.

The straightening of the cut through the uplands is at the expense of the alignment in Lake Union, but the variation is believed on the whole to be desirable.

The changes made in the location are in the interest of economy of construction and maintenance and for the convenience of navigation.

There would be some advantages in locating the canal through the "Portage" between Lakes Union and Washington, some 1,000 or 1,200 feet farther north than shown upon the maps. Such a location would be shorter and more direct, and with practically the same cost of construction. The route would lie across lands belonging to the State of Washington. The disadvantage of selecting the northern route would consist in leaving the existing small canal as an independent concern, the operations of which might seriously incommode and interfere with the operations of the larger canal, and with the control of the flowage from Lake Washington to Lake Union, which should be entirely under one control.

If, at any time in the future, it should be deemed best to change the location as indicated, such change should be accompanied by either the complete abandonment of the small canal or the cession of its control to the United States.

RIGHT OF WAY.

The State of Washington has recently laid out the tide lands about Salmon and Shilshole bays, leaving a waterway from the mouth of Salmon Bay through to deep water 500 feet wide. From the mouth of Salmon Bay to its head the waterway laid out varies from 300 to 1,000 feet in width.

In direction, this 500-foot waterway across the tide flats outside the throat of the bay is not entirely satisfactory, it being desired to make the approach more nearly from due west.

Therefore the right of way for the canal is laid out to include a strip to the south of Salmon Bay waterway, as shown on map No. 1.

The best location for the entrance lock was decided to be on the south side of the entrance, as shown on map No. 2. In order to provide for other locks which might be required in the future, and the requisite basin approaches thereto, together with dam and waste weir, and to lessen the curvature, it was deemed best to provide for widening the Salmon Bay waterway by taking a strip on the north side, as shown on map No. 2. Small pieces of land are required on either side of the waterway at the lock location and are included in the list. No other lands are required for the canal right of way until the head of Salmon Bay is reached.

From the head of Salmon Bay to Lake Union the canal right of way is laid out 300 feet wide. This width is that fixed upon by the Board of Engineers in 1890, and allows for a bottom width of canal of 80 feet, depth 26 feet, berm 6 feet high above water surface, the side slopes of canal prism and berm being one and a half to one. This leaves 62 feet on each side for such street and railway purposes as may be determined upon in the future.

This portion of the canal right of way takes in property which has been subdivided into lots, blocks, and streets.

The dimensions of every separate piece of land required for the right of way between Salmon Bay and Lake Union are shown upon maps Nos. 8, 9, and 10. These maps also show the location of all improvements. Most of these are small, cheap, wooden houses, and they are principally near the Lake Union end of the canal.

The canal right of way crosses the tracks and right of way of the Seattle, Lake Shore and Eastern Railway at an acute angle. It will be necessary for this railroad to give up a considerable portion of its right of way and adopt another route and another crossing of the canal.

The right of way required for the canal through the "Portage," or neck of land separating Lakes Union and Washington, is shown in detail on map No. 11. This right of way is laid out for the greater portion of the distance across the neck 392 feet wide, and for the remainder of the distance 322 feet wide. These widths are believed to be necessary and desirable, and were adopted after a careful study of the situation.

The width of 392 feet is adopted to provide for the canal and a wide berm and the side slopes of the canal cut, for future lock emplacement, for spillway, and for the requisite dwellings for the lock keepers.

Room is left to the north of the proposed lock for a larger lock which may be built in the future, and the 392 feet width is carried far enough to provide for a necessary basin at the head of the larger lock.

This right of way between Lakes Union and Washington takes in land which has been subdivided into lots, blocks, and streets, and the dimensions of each parcel of land included within the right of way are given on the map.

The right of way includes the small existing canal and spillway, and to make it full and complete it will be necessary to quiet all right, title, and interest in this small canal.

ADJACENT LANDS.

The language of the act of August 17, 1894, requires "a release from all liability to adjacent property owners."

This is construed to refer to all property and interests therein which will be permanently injured or altered by the proposed construction.

The project of the Board of Engineers of 1890 contemplates a dam and lock at the entrance to Salmon Bay from the Sound, which dam and lock shall raise the waters of Salmon Bay to the level of Lake Union and there maintain them.

The level at which it is proposod to maintain Lake Union is 25 feet above the datum of low tide in Puget Sound, or at a reference of 55 feet above the assumed datum plane of the survey. This proposed level would vary slightly either way, depending upon the season of the year, the amount used for lockage, etc. An allowance of 1 foot either way is considered ample to provide for these variations. It was therefore decided that the property from which deeds of release should be

required would be all that lying along Salmon Bay and the canal between Salmon Bay and Lake Union, which is lower than the reference 56, or 26 feet above low tide.

The lands along Salmon Bay and the line of the canal were carefully surveyed with level, stadia, and plane table, the whole based on triangulation and measured bases, and all lands lying below reference 56 determined. These lands are shown upon the maps, beginning with map No. 2.

These lands liable to submergence are of two classes: Uplands lying between high-tide line (reference 47) and the line of submergence (reference 56), and tide lands lying below the high-tide line.

The uplands are private property, and in the main have been platted into lots, blocks, and streets. The greater portion lies about the head of Salmon Bay, at an elevation but slightly above high tide.

The most valuable portion of the submerged land lies along the north shore of Salmon Bay in the town of Ballard. This area, together with the adjoining tide lands, is covered with buildings, mills, etc. In many instances the engines, boilers, etc., of the mills occupy a position but little above high tide. They will all have to be raised above the new water level or protected against the water by a bulkhead or embankment of some kind.

The tide lands have been surveyed by the State of Washington and divided up into lots, blocks, etc., which have been offered for sale, under an appraised valuation and in accordance with the laws of the State. Certain parties have the preference right to purchase these tide lands at the appraised valuation; some have been purchased and fully paid for, some have been purchased and partial payments made, some are in dispute between rival claimants, and some have not been applied for under the appraisement.

It would seem that the State of Washington, the present owner of most of the tide lands, and all persons having a legal interest in the lands or claim to a legal interest, should join in a release from liability. When the State has completely parted with its title to any portion of the tide lands, it, of course, could be left out.

Along Salmon Bay there are in places areas of varying width, the ownership of which is in dispute. These are the areas between the old meander line and the existing high-tide line, where the high-tide line is inshore from the old meander line. These areas, it is understood, are claimed both by the State and by the upland owners. They are marked on the map by figures dotted thus:  .

Upon the maps the uplands to be submerged are lined in blue, while the tide lands out to the harbor lines established by the State and the United States are left white.

It is proposed that the releases from liability shall cover every street, avenue, or alley, and every lot, any portion of which is within the submerged area. Each deed should also carry with it a release from all liability, in the event that in constructing the canal deposits of excavated material are made anywhere on those submerged or to be submerged areas. The spoil from the canal prism will reclaim much of the submerged land, but the Government should be left free to utilize the material excavated in the manner which may be deemed best at the time the work is being done.

Assuming that the entrance lock will be built as located, the right of extending the bulkheads or dams into the high ground on either side at the entrance should be secured, as specified on pages 122 and 274 of the descriptive list of property.

It was not considered necessary to include any lands about Lakes Union and Washington in the list of those from which deeds of release from liability should be exacted, as it is not proposed under the present project to materially alter the existing conditions about these lakes.

No property is included in the lists from which deeds of release are to be exacted which abuts upon the right of way for the canal between Salmon Bay and Lake Union, and between Lakes Union and Washington, and which is higher than 56 feet above the plane of reference.

There is a belt of land lying about the head of Salmon Bay, and about the lands liable to submergence, which is above the line of submergence, but below the level of the proposed berm of the canal; that is, between references 56 and 61. All of this land will have a natural drainage into the head of Salmon Bay after the canal is constructed. The line of drainage will, however, in some cases, be materially altered by the construction proposed. These lands have not been included in the lists of those from which deeds of release should be exacted.

There is a large depressed area shown on maps Nos. 9 and 10, on the south of the canal right of way which is below reference 56. This is all included within the property from which deeds of release would be required.

Surrounding this, however, there is a strip between references 56 and 61 which would be below the berm level, and for which drainage could be provided either through the berm embankment or down along the canal right of way to Salmon Bay.

The lands included in this strip between references 56 and 61 have not been included in the list of properties from which deeds of release from liability are required.

Attention is invited to the language of the law and to the facts just mentioned.

If it should be decided that the owners of any lands adjacent to Salmon Bay, Lake Union, or the connecting canal, other than those included in the lists herewith and which are hereinbefore generally described, shall be required to give deeds of release from liability, it will be necessary to prepare supplementary lists.

CORPORATE INTERESTS.

Besides the land included within the right of way for which full deeds are required and the area subject to submergence from the owners of which releases from all liability are required, there are certain corporate and vested interests whose possible claims must all be quieted before the right of way, etc., can be considered as complete.

A list of these has been made as far and as fully as they can be ascertained. Chief among these is the company owning and controlling the existing small canal between Lakes Union and Washington, and whose articles of incorporation include the right to construct a canal between Lake Union and Salmon Bay and through Salmon Bay to the sea. All rights and interests of the company, which is known as the Washington Improvement Company, should be quieted.

Attention is invited to the fact that across the neck of land between Lakes Union and Washington there is a strip of land laid out called "Pikes Canal Reserve."

It is not believed that the laying out of such a strip and so designating it carries with it any right to construct therein a canal, but if upon investigation it is found that any such right does exist, it should be quieted, as the existence of any secondary canal beyond the control

of the Government might result in serious annoyance and complications.

Two steam railroads cross the line of the proposed waterway—the Seattle, Lake Shore and Eastern, and the Seattle and Montana (Great Northern).

The Seattle, Lake Shore and Eastern crosses the proposed canal at an acute angle between Salmon Bay and Lake Union. It will have to materially alter its course, so as to cross the canal more nearly at a right angle. For this crossing a drawbridge will be required.

It is supposed that the deed to the right of way and release executed by this company will be full and complete, so that when the changes are made it will be compelled to build and operate its own drawbridge over the canal in accordance with the laws and regulations governing the erection and maintenance of drawbridges over the navigable waters of the United States.

Upon maps Nos. 9 and 10 Mr. Ricksecker has outlined a proposed change of route for the Seattle, Lake Shore and Eastern Railroad. This change involves the occupation of a portion of the canal right of way by the road. The advisability of consenting to this at the present time and under existing circumstances is questionable. The whole question of the occupation of the berms of the canal by railroads or highways of any kind should be left to be considered hereafter, when the canal is completed, and the new conditions which would be brought about can be understood and appreciated.

In approving the maps submitted, if they are approved, it would seem to be advisable to exclude any approval, implied or otherwise, of this proposed plan and occupation of the right of way as shown.

It will be necessary, however, to give this railroad the right of crossing the canal and right of way. This right should be under such regulations and restrictions as may be prescribed by the Secretary of War.

The Seattle and Montana Railroad crosses Salmon Bay near its head, where the water is very shallow, on a close pile trestle bridge. Just above this crossing is a similar crossing by a branch of the Seattle, Lake Shore and Eastern Railroad, and just above this a close bridge used as a wagon bridge and by an electric street-railroad line, called the West Street and North End.

All interests centering in these bridges should be required to give full deeds of release from liability, and when new crossings are up for approval they should all be required to unite and cross on one drawbridge of ample dimensions and properly located.

Another street-car line, the Seattle Consolidated Street Railway, crosses the line of the canal just below Lake Union. The line is located on Lake street, which cuts the line of the canal at an angle of about 30°.

The Third Street and Suburban Electric Railway crosses Lake Union about one-third of the way from Lake Washington to its lower end. The bridge on which it crosses will be an obstruction to navigation when the canal is completed, and will have to be rebuilt with proper drawbridges for the passage of vessels. All interests in this bridge should be required to join in a release from liability and agreement to build such a bridge as may be required in the interests of navigation.

There are two other bridges crossing the line of the canal, which are used by the public solely; one crosses the old canal at the "Portage," or neck between Lakes Union and Washington, and the other spans the small water course between Lake Union and Salmon Bay. The ownership of these bridges is unknown and uncertain, the corporation counsel

of Seattle declining to give an opinion in the matter. The public and private rights in these bridges should be quashed in some way to make the right of way complete.

There are several telegraph, telephone, and electric-light companies which will be more or less interfered with by the construction of the canal. Some of these are on the right of way and some on lands subject to submergence. The complete right of way, etc., should include deeds and releases from all these companies, and an agreement to abide by such regulations as may be hereafter established by the Secretary of War in regard to such matters.

STREETS.

It is supposed that the municipalities will have the right to give the necessary deeds and releases for the streets, avenues, and alleys in the right of way and lands subject to submergence. This is a matter, however, which should receive legal attention, so that the interests of the United States may be fully guarded.

Accompanying this report are 11 photographs,* taken by Mr. Ricksecker, along the line of the proposed waterway.

No. 1 is the entrance to Salmon Bay from Shilshole Bay at low tide. The location selected for the entrance lock is just within the point of land limiting the throat on the left or south. On the right is shown the northward curve of the Seattle and Montana Railroad.

No. 2 is a nearer view of the mouth of Salmon Bay. The lumber sawed at the mills in the bay and intended for water shipment is loaded directly upon barges, which at the proper time are towed out into the sound and unloaded on ships. The photograph is at low tide and shows two ships loading from barges.

No. 3 is a view of Ballard and Salmon Bay from the high land above the head of Salmon Bay. The view is taken at high tide. It shows the bridges across the head of Salmon Bay mentioned in the report.

The canal proper, between Salmon Bay and Lake Union, starts at the left-hand limit of the picture.

No. 4 is a nearer view of Ballard and the bridges across Salmon Bay mentioned in this report.

No. 5 is a general view showing Lake Union, and Fremont at the foot of the lake, with Salmon Bay in the distance. The low ground in the center of the picture shows the route of the canal between Lake Union and Salmon Bay.

No. 6 is a near view of the route of the canal between Lake Union and Salmon Bay. This shows the little stream connecting the two waters and the line of the Seattle, Lake Shore and Eastern Railroad, which cuts the line of the canal at an acute angle, as mentioned in the report.

No. 7 is a view at the head of the small stream running from Lake Union into Salmon Bay. This is taken at a very high stage. Ordinarily it flows very little water.

No. 8 shows the mills, etc., at the foot of Lake Union. The canal location as originally proposed in 1890 passed through and took in these mills. The location now adopted goes to the left of these mills and leaves them undisturbed.

No. 9 is a view of the "Portage," or neck of land between Lakes Union and Washington. Lake Union is in the foreground, and the small existing canal is shown.

---

*Not printed.

No. 10 is a view from Lake Washington, down into the small existing "Portage" canal.

No. 11 is from the Lake Washington end of the "Portage" canal, looking out toward the lake. The channel to be dredged out to deep water in the lake would pass to the right of the small island shown.

Very respectfully, your obedient servant,

THOMAS W. SYMONS,
Captain, Corps of Engineers.

Brig. Gen. W. P. CRAIGHILL,
Chief of Engineers, U. S. A.

REPORT OF ASSISTANT ENGINEER EUGENE RICKSECKER.

SEATTLE, WASH., *August 20, 1895.*

SIR: By an act of Congress dated September 19, 1890, an appropriation of $10,000 was made to select and survey the most feasible location and to estimate the expense of constructing a ship canal to connect Lakes Union, Washington, and Samamish with the waters of Puget Sound.

A survey and map was completed, and estimates were made upon two routes favorably considered by the examining board of engineers, consisting of Col. G. H. Mendell, Maj. T. H. Handbury, and Capt. T. W. Symons. The routes were identical from Lake Washington via the Portage to Lake Union, thence along the valley of the outlet of this lake to Salmon Bay. Here they diverged, one following Salmon Bay to its mouth at Shilshole Bay on Puget Sound, the preferred route curving to the southward across a ridge debouched into Puget Sound at Smiths Cove.

The last river and harbor bill contained an item appropriating $25,000—

"for dredging Salmon Bay and the improvement of the waterway connecting the waters of Puget Sound, at Salmon Bay, with Lakes Union and Washington by enlarging the said waterway into a ship canal, with the necessary locks and appliances in connection therewith: *Provided*, That no part of said amount shall be expended on the improvement of the waterway connecting the waters of Puget Sound with Lakes Union and Washington until the entire right of way and release from all liability to adjacent property owners have been assured to the United States free of cost, to the satisfaction of the Secretary of War."

That the public might comply with these requirements, you proposed to definitely locate the line of the canal upon the ground, and to determine by metes and bounds the area required for and that damaged by its construction. The Treasury officials opposed your recommendation to expend $5,000 of the amount appropriated, maintaining the expenditure to be contrary to the conditions of the act.

The sundry civil bill, approved by the President March 2, 1895, authorized the expenditure from the $25,000 previously appropriated of "the sum of $5,000 in making a definite survey and location of said improvements, and in preparing a cadastral map, showing each piece of property required to be deeded to the United States or from which a release is required, with its metes and bounds."

The proposed improvement, with the exception of the north shore of Salmon Bay, comprising the water front of the town of Ballard, lies wholly within the corporate limits of the city of Seattle.

SEATTLE.

On the east side of Puget Sound and a little south of the middle of its length, deeply embayed by the salt water of the sound on the west, by Salmon Bay, an arm of the sound, and the fresh water of Lake Union on the north, and by that of Lake Washington on the east, these, connected by streams of varying sizes, form an island, the greater portion of which is occupied by Seattle.

From a population of 1,107 in 1870 it increased to 58,890 in 1892, the largest town in the State of Washington.

The last United States census gave it 331 manufacturing establishments, employing 4,048 people, and $10,203,000 of finished product.

The trade for the year 1894 was estimated at $60,000,000.

The taxable wealth increased from $3,685,657 in 1882 to $54,311,106 in 1893.

Lumber, coal, and fish are the principal industries. Extensive operations are carried on in shipbuilding, hop growing, clay and pottery works, besides the usual foundries, factories, mills, and shops found in large and enterprising cities.

Five companies own and operate 278 miles of railways in the county, there being over 60 miles of electric and cable railways in the city.

Three transcontinental lines enter or start from the city, besides steamship lines to San Francisco, Alaska, and other points.

Large developed coal mines and ore deposits lie close to the east shore of Lake Washington.

There is, I believe, no other city in the world so nearly surrounded by available landlocked harbors, where commerce by rail and water can be so closely intermingled, where trade is flanked on one side by deep-sea harbors and on the other, less than 2 miles distant, by magnificent fresh-water bodies. That vessels of all kinds may have access to these lakes is the object of this improvement.

BALLARD.

The name of Ballard is given to the thrifty town occupying the gently rising ground from the north shore of Salmon Bay. Lumber and shingles are manufactured here by nine different companies.

The land was covered with heavy timber in January, 1889; five years later it supported a population of 3,000 souls.

ROUTE AND PLAN OF THE PROJECT.

The general route of the proposed canal leaves Puget Sound at the mouth of Salmon Bay; traverses the entire length of this bay; thence by a cut to Lake Union; through Lake Union to the eastern extremity; finally entering Lake Washington by a cut across a narrow ridge known as the "Portage." Coal was formerly lightered to this point from the mines on the opposite side of Lake Washington and carried across by tram cars to Lake Union. After being lightered across Lake Union it was again placed on tram cars and carried to the sound.

The project contemplates making a fresh-water basin out of Salmon Bay, a navigable salt-water body, by raising its waters to and maintaining them on a level with Lake Union by means of a lock at its mouth.

The present project calls for a lock between Lakes Union and Washington.

WORK OF THE SURVEY.

The work of the survey required an examination and study of the position of the surface of Lake Union to determine its final elevation and the area affected by raising the water of Salmon Bay to that height; to locate and permanently monument the right of way upon the ground, and to accurately describe each tract of land, lot, and fraction required, giving the name of the present owner.

This involved the making of an accurate cadastral and topographic map of the vicinity of the proposed improvement.

The recent survey of Salmon Bay by Mr. Stixrud for the State harbor line commission and State board of tide land appraisers was utilized almost in its entirety, supplementing it with the topography and other additions necessary for this work.

City Engineer R. H. Thompson, with the authority of the common council of the city of Seattle, worked in conjunction with me in Ross Addition in determining the most probable positions for block corners that had disappeared.

METHODS AND RESULTS.

The linear measurements were made with a Roe & Chesterman steel tape reading to hundredths of a foot, corrected in the field for temperature and pull.

Comparisons were made with a tape recently standardized by the Coast and Geodetic Survey.

A system of triangulation was carried over that portion of the route traversed by the right of way. The measurements of the base line on the Salmon Bay trestle, tape supported throughout, was as follows:

	Feet.
First measurement	1,375.7288
Second measurement	1,375.7212
Third measurement	1,375.7116
Mean result	1,375.7205
Range	0.0172

The angles of the triangulation were repeated twelve times on a 6¼-inch Buff & Berger transit from twelve stations.

The average angle correction was 02.48 seconds.

The signals used were 1½-inch square uprights, 8 feet long, surmounted with white muslin and held vertically over a center of tripods.

The lines of sight ranged from 1,000 to 2,250 feet in length.

The Lake Union check base gave:

	Feet.
First measurement	1,143.6950
Second measurement	1,143.7151
Third measurement	1,143.7079
Fourth measurement	1,143.7081
Mean result	1,143.7065
The computed length was	1,143.6950

Transit lines were run on nearly every street between these triangulation stations, forming a number of closed circuits.

These circuits were tied to the triangulation stations and carefully adjusted in the office.

The maximum error of closure is 1:10870.

The minimum error of closure is 1:58300.

The average error of closure is 1:29310.

The block corners of the different additions were connected with these transit lines, as were also the topographic stations.

Contour lines, vertical interval 2 feet, were placed over the entire area by means of the plane table. Two tables were used—a Keuffel & Esser heavy 9-inch head and a Fauth alidade with Johnson head. The latter instrument, with the heavier head, was most satisfactory on this detail work.

Stadia rods were 12 feet long, covered with the V-shaped device used on the United States Lake Survey, the alternate 6 feet painted red and black.

On a large number of the shots the telescope was brought to a horizontal position and the difference of elevation read directly from the rod. Nearly all improvements were located by this method.

The average length of the shot taken, exclusive of the hydrography, was 255 feet.

The average number was 3.4 per 100 square feet.

The elevation of stations was checked to the nearest hundredth of a foot between bench marks. Intermediates were read to the nearest tenth of a foot.

Previous to beginning topographic work, bench marks were established at intervals of about 800 feet around Salmon Bay, along the waterway to Lake Union and at the Portage.

The flooded area was outlined by pegs placed from 50 to 100 feet apart on the line of submergence. These served also as a check in making topography.

The portage was also connected by levels with the Fremont bench.

A 20-inch Keuffel & Esser level was used.

A small number of lot and block stakes found in the Ross Addition and the absence of them in the Union City Addition, compelled extended and carefully considered work in these additions. In the former all the stakes that could be found and all the improvements were first located. These formed a basis upon which was arranged the probable intention of the land surveyor as far as the recorded plat showed. In this case as in many others they failed to show either the angles, distances, or sizes of a majority of the lots. A street supposed to be 66 feet wide proved to be 65 feet at one end and 90 feet at the other. Some lots sold as 40 feet wide were but 5 feet. One lot shown of fair size on the plat contains 70 square feet.

In the Union City Addition at the Portage between Lakes Union and Washington, the land had evidently been platted on paper only. A subdivision of the Government section inclosing it disclosed an excess of land in two directions and the plat was thence readily fitted without complication, the individual property holders getting all or more than they paid for originally.

It is the intention of the city to perpetuate our location in these and the Denny & Hoyt's Addition by monumenting such street intersections as will permanently establish them.

Other additions connected with our work were the Ross second, Gilman's, Gilman Park (Ballard), and Bay Terrace.

HYPSOMETRY.

Our datum was placed 30 feet below extreme low tide to avoid negative figures by being safely below the constructive works of this project.

For the period of one year, from August, 1891, to August, 1892, the United States Coast and Geodetic Survey maintained an automatic tide gauge in Seattle Harbor, and from the seven highest tides occurring during that period deduced a value of 15.77 feet for the difference in height between high and low tide. This position of high tide corresponds to 47 feet (46.98) on our datum.

The lowest tide observed was, referred to datum (survey, 1890), 30 feet.

The level of Lake Union was found to vary from 23 feet (summer, 1894) to 26 feet (winter, 1894), reference 53 to 56. It is proposed to maintain it at an elevation of 25 feet or at the reference 55 feet, or 8 feet above high tide, allowing a maximum rise and fall of 1 foot, or a total variation of 2 feet.

LOCATION OF THE CANAL.

Since the survey of 1890 was made the State of Washington has established harbor lines at the mouth of Salmon Bay and waterway lines on that bay. To conform to these, and at the same time allow owners of shore property to utilize a maximum amount of frontage, the center line of the canal was placed as near the axis of the waterway as possible, resulting in slightly sharper curves (1,719 feet radius) than are in general use on ship canals.

Ultimately, with the entire waterway dredged to a uniform depth, plans adapted to economical movement will obtain.

For convenience of notation the route is divided into eight sections, the characteristic features of which are shown in the following table:

Section.	Stations. From—	Stations. To—	Description.	Length in— Tangent.	Length in— Curve.	Approximate radius.	Bottom width.	Average depth of cutting.	Curvature.	Cubic yards.
		0	(26 feet of water in Shilshole Bay at extreme low tide.							
A	0	28+50	Entrance to lock, mouth Salmon Bay.	950	1,900	2,604.5	300	25	41 48	899,000
B	28+50	34+00	Exit from lock (south end), Salmon Bay.	550	.....	.....	120	35	.....	95,000
C	34+00	52+09.4	At the Narrows	928.9	880.5	1,719.1	(300 to 200)	9	29 21	157,000
D	52+09.4	150+00	East end Salmon Bay waterway.	5,209.6	4,581	(1,719.1 to 2,022)	200	5	144 12	427,000
E	150+00	205+60	West end of Lake Union at Fremont.	1,760	3,800	34,377.5	80	25	6 20	631,000
F	205+60	345+00	Lock at the Portage	4.405	9,535	(1,719.1 to 1,433)	200	1	330 0	335,000
G	345+00	367+00	East side of the Portage, Union Bay.	2,200	.....	.....	80	45	.....	539,000
H	367+00	415+00	26 feet of water in Lake Washington.	4,800	.....	.....	200	15	.....	582,000
				20,803.5	20,696.5	.....	.....	.....	.....	3,665,000
				41,500						

In Section A, a portion of the State tide lands are taken to provide a basin in which the vessels awaiting lockage may lie protected from the severe but exceptional storms which two or three times during the winter months sweep the sound from the north.

The surplus tide land left on the north might be platted to advantage by the State in lieu of the portion required by the canal.

Experience may prove that a breakwater trained from the shore to deep water along the north side of the canal waterway will be necessary.

A small amount of tide land and upland is required to connect the locks and dam at the mouth of Salmon Bay with the mainland by means of a bulkhead, and also for power and keeper's houses.

Another piece of upland is required in Section C to lighten the sharp curve existing in the present water course.

From the east end of Salmon Bay waterway to Lake Union the new location follows the direction of the last course of the south side of that waterway, then deflects northward on a ten-minute curve for 3,800 feet, then on a tangent into Lake Union.

The desired right of way, 300 feet wide, lies along a flat valley but a few feet higher than Lake Union at its upper end. This valley was platted into lots several years ago; many of them have been sold and a number of these are occupied by improvements.

The bottom width of the canal in this section is to be 80 feet, with slopes of one and one-half to one, and a depth of water of 26 feet; the width of the water surface will be 158 feet. By placing the berm 6 feet above the water surface there will remain 62 feet of land on each side of the canal that will be available for street purposes, railway lines, etc.

Section F is entirely in free navigation. A small quantity of soft mud at the east end of the section must be moved to give the required depth of water.

Section G, across the high narrow ridge at the Portage, has been changed from a curve to a tangent. The change has been made somewhat at the expense of alignment in Lake Union, but the reasons for a straight channel across the upland with reduced (80 feet) bottom width at the entrance to or exit from a lock should have greater weight than increased curvature for a short distance in a 200-foot channel.

The highest point on the route (97 feet) occurs in this section, where for a distance of 200 feet the cut will average 57 feet.

The average for the entire section of 2,200 feet is less than 40 feet.

The changes made in the location of the canal in Section E have met with general public approval, and give, I believe, an economical route in point of first cost, less valuable right of way, and reduced excavation, maintenance, absence of sharp curves and attendant bank protection, allowing increased speed for traffic, and usage, a practically straight channel saving time in transportation.

It is to be regretted that your way was not clear to place the route across the Portage, some 1,200 feet farther north, where with an increased cut of 10 feet the route to deep water in Lake Washington would be shortened, the amount of excavation decreased by 15,000 cubic yards, but of most importance would be the reduction in amount and degree of curvature.

This route would lie entirely on land belonging to the State University, across which a right of way might be arranged for at some future time.

SUBMERGED LAND.

From the lock at the mouth of Salmon Bay to a point near Lake Union there lies a considerable tract of lowland that will become inundated by the raising of the water of Salmon Bay.

By far the largest body of this land lies around the head of Salmon Bay at an elevation little above high tide. It is unimproved and marshy, except in midsummer, and of little present value.

A narrow fringe of submerged land extends around the shore of Salmon Bay, and upon this, on the north shore, in the town of Ballard, the heaviest damage falls. This area is covered with a number of large milling plants whose boilers, engines, and many pulleys occupy a position but little higher than ordinary high tide; in fact, some companies are periodically obliged to protect their machinery from the highest tides.

The spoil earth from the canal prism will reclaim a large portion of the land submerged. Other portions must depend upon the building of a sewer running to tide water of Puget Sound for drainage.

Mr. Benezette Williams's plans for a system of sewerage for the city of Seattle, made a few years ago, contemplated an outlet along the south shore of Salmon Bay to the sound.

The following table shows the approximate areas affected in the different sections:

Section.	Right of way.			Affected area.		
	Full lots or blocks.	Fractional lots or blocks.	Approximate area.	Full lots or blocks.	Fractional lots or blocks.	Approximate area.
			Acres.			*Acres.*
A	3	12	8			
B	3	10	2	5	5	3
C	18	18	8	36	16	9
D	1	8	1	407	84	255
E	169	195	38	295	156	45
G	51	7	21			
Total			78			312
Grand total						390

MAPS.

The route of the canal and vicinity, with the exception of the free navigation in Lake Union and Lake Washington, has been shown on eleven sheets, 24 by 30 inches, upon a scale of 100 feet to 1 inch.

An index sheet showing the whole improvement on a scale of 1,000 feet to 1 inch, with a vicinity map, profile of the route, and cross sections of the canal accompanies the maps as a title-page.

Tracings and blue prints of this work are herewith.

All computations were based on a system of rectangular coordinates, the original placed at such a point in Puget Sound as to be south and west of the entire work.

The meridian used is the same one adopted on the survey of the State tide lands from a number of observations on Polaris and is approximately 7′ 28″ west of the city's meridian.

The names of lot owners have been left off of the maps to avoid confusion. They appear in the descriptions of the property referred to hereafter. The names of owners of acre property appear with the property lines edged with color. Where the upland owner has either purchased or made a first payment, or has applied to purchase tide land from the State, the edge is continued around the land claimed although the State has not parted with the title.

Few of the upland owners have applied for land in the supplemental plat of the State tide lands, which leaves an unedged strip of land across property that would otherwise be marked in one piece.

It has been a difficult matter to show the ownership of some of the tide lands, owing to the fact that the State has not finished its examination of applications and few official descriptions can be obtained at this time. There are also a number of contests between parties claiming the first right to purchase, and these remain undecided.

Upland blocks and acre property are tinted brown. The existing water courses and the Salmon Bay waterway have a blue tint, while the State tide lands are left untinted.

Blue work refers in all cases to water.
Brown work refers to upland.
Black work refers to culture.
Vermilion refers to the canal.

DESCRIPTIONS OF PROPERTY AND NAMES OF OWNERS.

With this is forwarded you descriptions in duplicate of every piece of property included in the right of way, with the name of the person owning or claiming same, the designation of all affected property, with name of owner or claimant, and the name of every company claiming right of any kind or holding franchises from the city.

All avenues, streets, and alleys are credited to the corporation within whose limits they lie.

The Seattle and Ballard tide lands all appear under the ownership of the State except where they have been entirely paid for by a claimant.

Many persons have made a first (one-tenth) payment on the tide lands, as shown on the plat. Official descriptions of this property have been obtained and the property appears under the buyer's name also. Others have made application to purchase, and their claims have yet to be examined by the State. Where these persons have exercised their rights within the required time, the land they have applied for has been described and credited to them as a claimant. In some cases the applications conflict, either from a desire to safely cover all the land to which the claimant is entitled or from the fact that the upland boundary lines are uncertain.

The supplemental plats of the tide lands, referred to above, cover the ground lying between the Government meander line and the high-tide line, where the latter lies above the former.

The State's right to this land has been questioned, and the court has granted a permanent injunction against the filing of these supplemental plats of the Seattle tide lands.

The Ballard supplemental plats have been filed.

Releases should be obtained from both the State and upland owner.

The plan followed in preparing these descriptions was to cover—

First. All property included in the right of way.

This is divided as follows: Union City Addition at the Portage; Denny & Hoyt's Addition and Supplemental; Ross Addition and Ross Supplemental; land at Salmon Bay; acre property and Seattle and Ballard tide lands; avenues, streets, and alleys.

Second. All property submerged or damaged, as follows:

Denny & Hoyt's Addition; Ross Addition, Ross Second Addition; Salmon Bay, commencing at the east end and following west along the south shore, returning east along the north shore, including Gilman's Addition, Bay Terrace Addition, and Gilman Park, in the city of Ballard; avenues, streets, and alleys.

Third. Corporate interests: A. Included in the right of way; B. Included in the affected area.

Fourth. Leases.

Fifth. Bridges.

The last State legislature passed an "Act to grant to and prescribe powers of counties relative to public works undertaken or proposed by the State of Washington or the United States, and declaring an emergency."

It seems to be the general opinion that upon the approval of these maps and the receipt of the information they contain, together with the descriptive lists of property with the owners' names, by the commissioners of King County, condemnation proceedings will be instituted against the owners of the property required and affected.

When these suits are terminated, the county will be able to offer to the Government a clear title to the land required for this improvement, with a release from all that might be damaged.

RAILROADS AND BRIDGES.

The alignment of two railways is affected by this improvement. A proposed route for each one is shown on the maps.

That for the Seattle, Lake Shore and Eastern Railway contemplates the building of 1,800 feet of new line, exclusive of a skew draw allowing a clear waterway of 120 feet. Three ten-degree curves are used, with short tangents between. The line cuts but 16 lots, 4 of which are almost entirely taken by the canal right of way, utilizing for the most part the berm of the canal and streets. A spur line extending to Ballard is projected along the canal berm, across unplatted property and on A treet in Ballard to a connection with their present line on Shilshole avenue.

The route outlined for the Seattle and Montana Railway parallels the Seattle, Lake Shore and Eastern Railway, east through Gilman's Addition, then passes on a 10° curve to the canal, crossing it at the east end of Salmon Bay waterway on a drawbridge, with a clear span of 120 feet, then on an 8° 48′ curve westward, entering Ballard on A street, paralleling the Seattle, Lake Shore and Eastern Railway spur. The chief advantages of this route are a minimum length of drawbridge; the draw is placed about mid distance on a long tangent in the canal, the line is removed from the water front sufficiently to allow the construction of long slips and docks across the tide flats, slips that can be placed parallel with the axis of the Salmon Bay waterway affording a straight route for vessels entering and departing, and that will require little dredging to make them navigable; docks solidly built out of the material taken from the slips and conveniently placed with reference to railway transportation.

One other location called the alternative route is shown, which contemplates a pier near the center of the Salmon Bay waterway, about 400 feet east of the present West Street and North End Electric Street Railway bridge.

A crossing at this point will materially shorten the length of new road required, but the cost of the drawbridge will be greater.

The objections to this location are, first, that the area adjacent to the waterway will be cut in such a manner as to materially affect its usefulness for slips and docks in the transshipment of goods. Second, the drawbridge will obstruct the waterway, making the management of war and other large vessels difficult. It is probable that through traffic on this road will untimately cross Salmon Bay near its mouth and enter Seattle along the south shore of this bay.

To provide for the least number of crossings, the drawbridges should be designed for traffic of all kinds, roads, and railways.

With the three draws between Salmon Bay and Lake Union, the two mentioned above and a highway bridge on Lake avenue, the distance, one mile, would be divided almost equally into two parts.

INDUSTRIAL.

The existing industrial establishments that would be greatly benefited by the improvement are the many mills on Salmon Bay and Lake Union and the coal mines. Lake Washington being inaccessible, the shores are largely in a natural state.

The mills are obliged to handle their product a number of times before it is finally deposited on board vessels for shipment.

Vessels loading from Salmon Bay are anchored in deep water of the sound opposite the mouth of the bay 1.7 miles from the mills. Here they receive their cargoes from barges that have been previously loaded at the mills and towed alongside. A number of scows and tugs are maintained for this purpose.

The lumber shipped from Fremont Mill on Lake Union is loaded upon cars at the mill and switched to the Smith's Cove dock, 3.6 miles by rail, and transshipped thence to vessels.

These mills handle a large quantity of timber 100 feet long, and the several handlings form no small item in the cost.

Tributary to and but a short distance from Lake Washington are the four large coal-mining properties of New Castle, Franklyn, Isaquah, and Black Diamond.

Their product is shipped by rail to Seattle, where large bunkers are expensively maintained owing to the active operations of the Teredo navalis.

Bunkers built in the fresh water of Lake Washington would last for a very much longer period.

A large saving would be effected in the loading of vessels through the absence of the rise and fall of the 17-foot tides.

The distance to tidewater would be reduced to almost nothing; in fact, two of the mines could, by means of wire-rope cables, convey their output directly from the mines to the vessels.

The commercial statistics of these plants were furnished you with my annual report of June 9, 1895.

A number of photographs of the route have been sent you, but the continued dense smoke has prevented the completion of the rest.

My thanks are due to Civil Engineers Stixrud and Nasten, and to City Engineer R. H. Thompson, for courtesies received, and also to those who have so earnestly aided me, interesting themselves beyond the mere matter of dollars and cents.

Respectfully submitted.

EUGENE RICKSECKER,
Assistant Engineer.

Capt. T. W. SYMONS,
Corps of Engineers.

ACT OF THE LEGISLATURE OF THE STATE OF WASHINGTON.

Chapter II (S. B. No. 92).—Relating to public works.

AN ACT to grant and prescribe powers of counties relative to public works undertaken or proposed by the State of Washington or the United States, and declaring an emergency.

Be it enacted by the legislature of the State of Washington:

SECTION 1. Every county in this State is hereby, for the purposes of this act, declared to be a body corporate, and is authorized and empowered by and through its board of county commissioners, whenever said board shall judge it to be clearly for the general welfare and benefit of the people of the county, and so far as shall be in harmony with the constitution of this State and the provisions of this act, to condemn and appropriate as hereinafter in this act provided, and to dispose of for public use such lands, properties, rights, and interests as are hereinafter in this act mentioned, whenever the Government of the United States or of this State is intending or proposing the construction, operation, or maintenance of any public work situated or to be situated wholly or partly within such county, or the expenditure of money or labor for the construction, operation, or maintenance of any such work, and such condemnation or appropriation will enable the county to aid, promote, facilitate, or prepare for any such construction, operation, maintenance, or expenditure by either or both such governments, or to fulfill or dispose of any condition upon which such construction, operation, maintenance, or expenditure is by law or from any cause contingent, and no property shall be exempt from such condemnation, appropriation, or disposition by reason of the same having been or being dedicated, appropriated, or otherwise reduced or held to public use.

SECTION 2. The board of county commissioners is hereby authorized and empowered in aid of the powers granted or prescribed in the foregoing section to levy, annually, a tax as large as may be necessary, but not exceeding the rate of one mill on the dollar, upon all the taxable property in the county, such tax to be assessed, levied, and collected at the same time and in the same manner as taxes for general county purposes; but the proceeds of said taxes, when collected, shall constitute and be a special fund, applicable solely to the cost of such condemnation, appropriation, or disposition as is mentioned in the foregoing section and the expenses incident thereto.

SECTION 3. The right of eminent domain for the purposes intended in this act is hereby extended to all counties in this State, and every such county for any purpose of condemnation, appropriation, or disposition such as is mentioned in the first section of this act is hereby authorized and empowered to condemn and appropriate all necessary lands and all rights, properties, and interests in or appurtenant to land under the same procedure as is or shall be provided by the laws of this State for the case of any similar condemnation or appropriation by other corporations.

SECTION 4. Any county purpose mentioned in this act shall be deemed and held to be a general county purpose, and any indebtedness contracted or to be contracted therefor shall be deemed and held to be an indebtedness for general county purposes, and all the provisions of the law of this State relative to indebtedness for general county purposes or the contracting of such indebtedness or the bonds for funding the same shall be deemed applicable to any indebtedness contracted or to be contracted or any bonds issued by any county under this act, but the accounts of the county,

with respect to the receipts and disbursements of all moneys received or disbursed by the county under the provisions of this act, shall, for each condemnation, appropriation, and disposition, be so kept as to clearly and fully exhibit such accounts separate and apart from the other accounts of the county.

SECTION 5. Any condemnation, appropriation, or disposition intended in this act shall be deemed and held to be for a county purpose and public use within the meaning of this act when it is directly or indirectly, approximately or remotely for the general benefit and welfare of the county or of the inhabitants thereof, or when it is otherwise within the meaning of the phrase "for a county purpose," as occurring in the constitution of this State.

SECTION 6. All acts or parts of acts inconsistent with the provisions of this act are hereby repealed.

SECTION 7. Inasmuch as there is no adequate provision of law now existing for such condemnation, appropriation, or disposition by counties of this State as is intended in this act, an emergency is hereby declared to exist, and this act shall take effect from and after its approval by the governor.

Passed the senate February 6, 1895.
Passed the house February 9, 1896.
Approved February 12, 1895.

LETTER OF CAPT. W. L. FISK, CORPS OF ENGINEERS.

UNITED STATES ENGINEER OFFICE,
Portland, Oreg., April 2, 1896.

GENERAL: In reply to your communication of March 24, 1896, I would respectfully state that detailed estimates of the cost of the work therein referred to were submitted with the report of the board of engineer officers that investigated the subject in 1891. (See Annual Report, Chief of Engineers for 1892, p. 2782 et seq.)

From the wording of the river and harbor act of August 17, 1894, reference being made to "the waterway connecting Puget Sound at Salmon Bay with Lakes Union and Washington," and as the only existing waterway opened into Shilshole Bay, the latter was understood to be the route preferred by Congress.

The estimate for this route by the board of engineers referred to was $2,902,859.23, and included provision for all land needed for the work or to be flooded by it, all changes of existing roads, streets, and bridges, and all necessary changes of the several railroads affected, and for raising or removing various buildings, mills, and wharves.

Deducting all these contingencies, as they seem to be included in the provision that "the entire right of way and a release from all liability to adjacent property owners" are to be secured to the United States free of cost and to the satisfaction of the Secretary of War, the board's estimate reduces to $2,471,751.26 for actual construction. The slight changes in location mentioned in Captain Symons's report of August 29, 1895, would make almost no change in the cost of the work.

Very respectfully, your obedient servant,

W. L. FISK,
Captain, Corps of Engineers.

Brig. Gen. W. P. CRAIGHILL,
Chief of Engineers, U. S. A.

o